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ABSTRACT

The available evidence pertaining to the decline in scores on the Scholastic Aptitude Test (SAT) and the American College Testing Program (ACT) is reviewed in terms of: the test, the test-taking population, the college bound population, the schools, and societal factors. The SAT score decline is described in both graphic and tabular form, and population data for the years 1957 through 1973 is presented. It is concluded that the evidence confirms a general decline in the abilities of the college bound population, but is less clear with respect to the high school population. It is speculated that the declines in the college bound population are due to several factors acting in combination: increases in the proportion of low- and middle-income students, reductions in the numbers of test repeaters, changes in the mix of SAT-user colleges, and less strict college admission policies. (Author/EVH)

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The SAT Score Decline: A Summary of Related Research

Hunter M. Breland
Educational Testing Service

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INTRODUCTION

Since 1963, SAT score averages have declined each year for 12 successive years. Verbal score averages have declined a total of more than 40 points, and a similar but less dramatic decline has occurred in the mean SAT-mathematical score. The nature of these declines is depicted in Figure 1. In Table 1, the values shown in Figure 1 are contrasted with other interpretations of the declines based upon different ways of computing the yearly averages. During the past two or three years numerous explanations have been offered for these declines. It is the intent of this paper to present the rationale of some of the more prominent explanations and to cite available research evidence relating to each.

All the explanations relate to some kind of change that has occurred concurrently with the score declines, and these explanations fall into four general areas of classification: the test, the population taking the test, the schools, and societal factors. Explanations suggesting that the problem resides within the test, although less common than other explanations, usually point to the possibility that the test may have become more difficult. It is also sometimes suggested that tests like the SAT are simply irrelevant in a modern world where written materials are rapidly being replaced with other communication media.

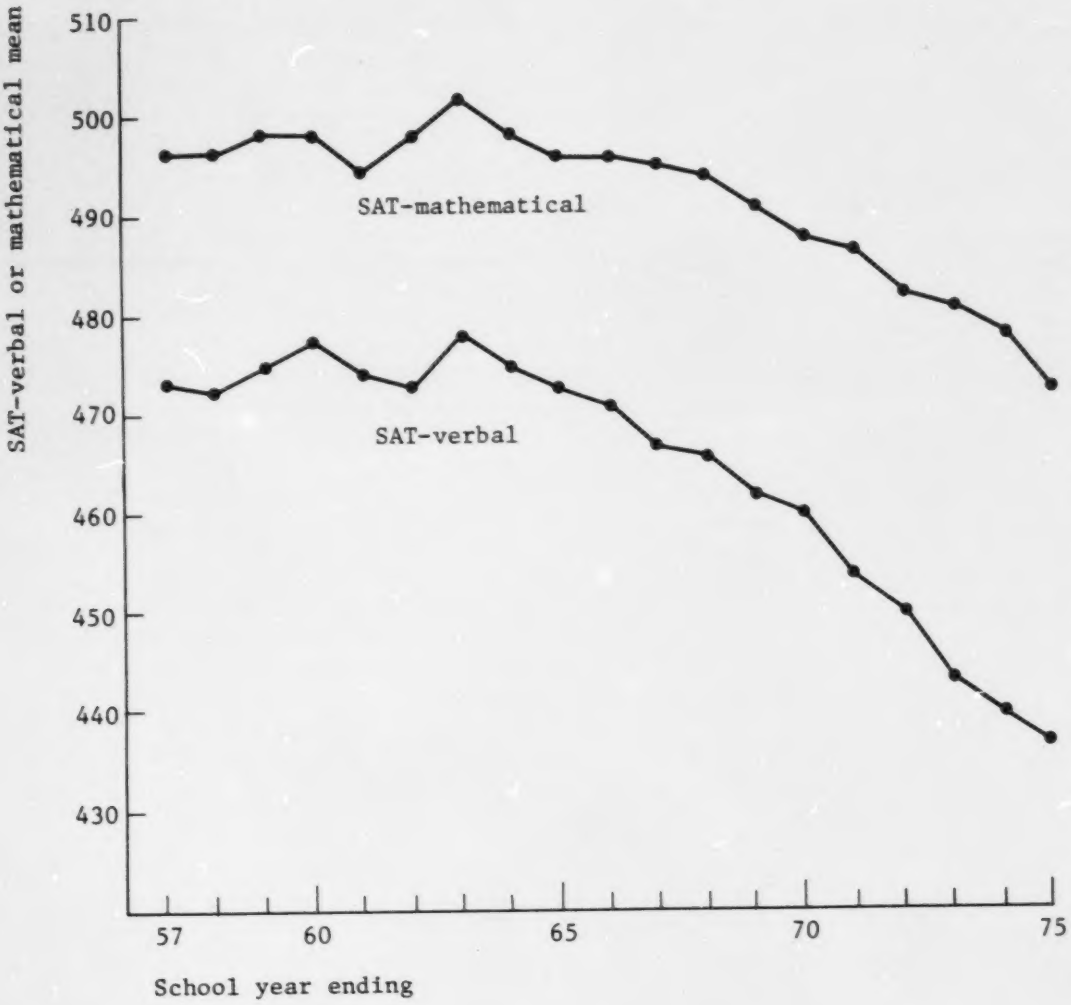
Others argue that, because of emerging egalitarian philosophies--coupled with financial difficulties in postsecondary institutions--many colleges are no longer selective. As a result, students may have been admitted to colleges in the past decade who would have been rejected in previous years. A symptom of this trend in college admissions, it is alleged, is a trend toward increasingly easier college textbooks, since it is claimed that today's college students cannot read as well as did students of earlier years. Of course, the population of students taking the SAT may not be representative of the college-bound population, and changes in the SAT candidate population over the period of the declines may have been different from changes occurring in the total college-bound population.

The most popular set of explanations shifts the burden from the colleges to the schools. In particular, there is speculation about the quality of secondary education in America. In their attempts to be progressive, it is said, schools have become too permissive, and the result has been that traditional academic skills are no longer learned. Those who espouse this explanation often note the increasing constraints on the teaching profession, the encroachment of the courts, and reduced expenditures for education.

A final set of explanations focuses on a broad range of societal factors. Advocates of these explanations note trends among adolescents toward drug use, alcoholism, television watching, and other similar factors that would appear to have detrimental effects on the development of academic aptitudes. Additionally, some would relate the decreased competition for college admission and the use of nonacademic criteria in awarding scholarships to a reduction in the motivation to perform well on admissions tests.

In the sections that follow, explanations such as these are examined in the context of research evidence. In recognition of the responsi-

Figure 1. SAT-Verbal and SAT-Mathematical Means for the Period 1957-1975*



*These means represent all scores reported. Thus, persons having more than one score are counted more than once.

bility of the test developer, the order of consideration begins with the SAT itself. From a research perspective, the remaining explanations are best examined with respect to evidence pertaining to specific populations. These remaining explanations are considered in an order of increasing population size. Thus, following the discussion of the SAT, first the SAT population is examined, next the college-bound population, next the population of high school graduates, and finally extranational populations.

Table 1. SAT-Verbal and SAT-Mathematical Means: Two Methods of Computation

School year	All scores[a]		College-bound[b] seniors only	
	V	M	V	M
1956-57.	.473	496	---	---
1957-58.	.472	496	---	---
1958-59.	.475	498	---	---
1959-60.	.477	498	---	---
1960-61.	.474	495	---	---
1961-62.	.473	498	---	---
1962-63.	.478	502	---	---
1963-64.	.475	498	---	---
1964-65.	.473	496	---	---
1965-66.	.471	496	---	---
1966-67.	.467	495	466	492
1967-68.	.466	494	466	492
1968-69.	.462	491	463	493
1969-70.	.460	488	460	488
1970-71.	.454	487	455	488
1971-72.	.450	482	453	484
1972-73.	.443	481	445	481
1973-74.	.440	478	444	480
1974-75.	.437	473	434	472

a. These are the values presented in Figure 1. These means represent all scores reported. Students represented in these means are aggregated without regard to their level of preparation, and students are counted as many times as they have taken the SAT.
b. From College-Bound Seniors, 1974-75. In these means each student is counted only once. For students who have taken the SAT more than once, only the most recent scores earned prior to graduation are counted. The SAT means for the 1967-71 high school classes are estimated values. Corresponding estimates for high school classes prior to 1967 are not available.

THE SAT

Although the instrument itself has not normally been the focus of explanations, it is appropriate to ask whether some change in it might have contributed to the score decline. If the items that make up the SAT now require more complex mental processes than they originally did, a decline in average performance might result. If the SAT items contain material no longer normally learned, either at home or in school, it would be expected that recent cohorts would perform poorly. Or, it could be, in an advanced technological society dominated by television and other nonwritten forms of communication, skills such as those examined in the SAT are no longer necessary or relevant.

Difficulty of the SAT

Since the SAT is changed each year as different forms are generated, and since it has changed over the years to make it more responsive to the needs of the educational community and to improve individual questions where possible, there has always been the concern that the test could become either slightly more difficult or slightly easier as such changes are introduced. Over a number of years, the small changes in difficulty could grow systematically and result in a substantial drift in the score scales. To control for this kind of drift, a statistical procedure is regularly followed to insure that reported scores are directly comparable from one form of the test to any other form. This control of difficulty is achieved by retaining identical items in test forms in a systematic way so that all forms can be reported on the same score scale. Test-form "equating" of this kind has been a paramount concern in all College Board test forms since 1941. The equating is done to control for normal form-to-form variations in difficulty. Indeed, were it not for these procedures, discussions of score decline would be almost meaningless. A detailed description of the SAT equating procedures is given in Angoff (1971a, 1971b). The difficulty of maintaining perfect scale stability should be recognized. With respect to this particular problem of scale stability, Wilks (1961) observed:

"It may not be possible to get a definitive answer to this question even under the most ideal conditions of investigation since invariance depends not only on such factors as the reliability of the tests, the effectiveness of statistical techniques of equating and sampling fluctuations in groups of candidates used for equating, but also on the invariance of the performance of succeeding generations of candidates on the subject matter used for equating the successive forms." (p. 15)

Periodically, studies are conducted to check the equating mechanisms. One equating study, Stewart (1966), showed that the SAT scale had been stable during the period 1944 to 1963. The most recent study of this type, Modu and Stern (1975), examined the period 1963-1973, a period during which SAT mean scores have declined substantially. The results obtained by Modu and Stern suggested that during the period of the score decline some drift in the SAT scale did, in fact, occur. However, the scale drift indicated by the study was such as to cause recent

scores to be higher than they should have been. Accordingly, a score decline would not appear to be attributable to the scale drift. Since difficulties in sampling and in other procedures may have affected the precision of the Modu and Stern analysis, a study designed to determine more precisely the magnitude of the long-term drift in the SAT scale is currently underway (Marco and Stewart, 1975).

A clearer picture of the difficulty issue is provided by the performance of samples on test sections used for equating--that is, sections that are identical across test administrations and testing years. During the past decade, new samples of the SAT population have consistently scored lower on the same material than old samples. Data from the Modu and Stern study, presented in Table 2, illustrate this trend.

In the case of the first verbal comparison in Table 2, a reprinted section of a verbal test given in 1963 (Form bm) was readministered in 1973--and in the same month, December.[1] Out of the 40 items in this reprinted section, the 1963 sample averaged in excess of 18 correct; the 1973 sample averaged less than 14 correct. For the shorter period from 1966 to 1973, the verbal decline is slightly less than that from 1963 to 1973, as would be expected. The same pattern is evident in the comparisons of the mathematical sections in Table 2. In 1963, the sample obtained an average of more than 10 of 25 mathematical items correct. In 1973, when the same 25-item section was reprinted and administered, the sample obtained less than an average of 8 items correct. And the mathematical decrease from 1966 to 1973 is slightly less than the mathematical decrease for the longer period from 1963 to 1973.

Relevance of the SAT and Curricular Change

Although the skills required by the SAT are in many cases similar to skills acquired in schools, it should be emphasized that the test was not designed to measure school performance. The SAT was designed

Table 2. Comparison of Identical SAT Sections for Two Time Intervals

Test-section type (form)	Number of items	When administered	Sample size	Mean
Verbal (bm)	40	Dec. 1963	1,500	18.43
Verbal (bm)	40	Dec. 1973	5,000	13.99
Verbal (bh)	40	Dec. 1966	5,000	17.23
Verbal (bh)	40	Dec. 1973	4,915	13.99
Mathematical (bk)	25	Dec. 1963	1,500	10.41
Mathematical (bk)	25	Dec. 1973	5,000	7.90
Mathematical (bg)	25	Dec. 1966	5,000	10.94
Mathematical (bg)	25	Dec. 1973	4,921	8.91

to measure long-term developed verbal and mathematical reasoning abilities--attributes that are related to college performance. Therefore, the relevance of the SAT is best evaluated by its predictive validity. Numerous research studies have demonstrated the predictive validity of the SAT during the period of the score decline (e.g., Cleary, 1968; Temp, 1971; Fincher, 1974).

In a culture dominated by television, it is sometimes suggested that the reading and other fundamental skills measured by the SAT are less important than they once were. The increased use of audiovisual aids and materials in the schools may even further intensify the oral-aural influence of television. In recent years the schools have also emphasized other nontraditional kinds of learning, such as noncognitive, interpersonal, and career skills. With these kinds of changes in the schools and in society, some believe that the questions used in the SAT may be more difficult for recent high school populations even though their abilities are as great or greater than ever. Nonetheless, while the schools may have changed, the relationship between SAT scores and college performance has not.

Were the SAT decline only in terms of mathematical skills, a curricular explanation might be available. Recent high school students who grew up with the "new math" would be expected to perform less well on those portions of the mathematics test that deal with the more traditional arithmetic and algebraic skills. As a result, the average SAT-mathematical scores of recent students would be lower. However, this kind of curricular change does not explain the more pronounced decline in SAT-verbal score averages. Moreover, curricular explanations fail to consider the probability that SAT scores are substantially influenced by experiences outside school, including family life and other factors.

Accordingly, the relevance of the SAT cannot be assessed in terms of its similarity to school curriculums. Nor should the SAT be judged entirely on the basis of its demonstrated use in predicting college performance. With open admissions policies and the proliferation of community colleges, one of the more important uses of the SAT today is for student placement in courses of instruction. Additionally, SAT scores in the aggregate are useful to institutions as management information and to the larger society as an indicator of the nature of the college-bound population. Finally, SAT scores tell the student something about himself. Although the language of the test is standard English, this is also the language of most books, journals, newspapers, and magazines--and it is the language of upward mobility in American society.

THE SAT POPULATION

If the SAT itself has not changed sufficiently to account for the decline in mean scores, then the next logical assumption is that the population of students who take the test has changed. Changes in the population taking the test could have resulted from a number of factors. Principally, there may have been a change in the mix of colleges requiring the SAT, changes in the way students repeat or do not repeat

the test, changes in the gains they make when repeating, and changes in the attitudes of students toward the admission process--or changes of all three kinds in varying combinations.

SAT User Colleges

When the College Board was first formed, it consisted primarily of prestigious Eastern colleges, but over the years this situation has changed. And, in recent years, some institutions have changed to an "open admissions" policy and have discontinued membership in the Board. At the same time, large numbers of community colleges have been founded, some of which require their students to take the SAT. This change in College Board colleges, and thus perhaps in the kinds of students served, may have contributed to the decline in the SAT mean scores. Although data on the composition of the candidate group over the period of the score decline are very limited, annual summaries have been made of the number of score reports sent to specific colleges. A study currently in progress (Schrader) focuses on the use of those score-report data to explore changes in the College Board candidate population. In this study, tabulations of SAT score reports received by institutions are being made by state, by Carnegie Commission institution type,[2] and by institutional requirements for SAT or American College Testing Program (ACT) tests. Preliminary results from this investigation are presented in Table 3. This preliminary analysis suggests noticeable changes in the patterns of score reporting for the academic years 1960-61, 1966-67, and 1973-74. For example, from 1960-61 to 1973-74, the proportion of SAT score reports going to the most selective liberal arts colleges decreased from 13.2 percent to 5.6 percent, and the proportion of score reports going to two-year colleges increased from 1.9 percent to 8.6 percent. These results make it clear that College Board candidates have changed substantially in their patterns of college applications during the period studied. The extent (if any) to which these changes contributed to the score decline, however, cannot be estimated from this study.

SAT Repeaters

A subset of students who take the SAT repeat the test one or more times. At least two different kinds of score-decline explanations have been suggested that relate to repeaters. First, it has been noticed that in recent years a smaller proportion of students who take the SAT as juniors repeat it as seniors and that a steady decline in this proportion has occurred since about 1962. Since this decline in repeating proportion covers about the same period of time as the score decline, it is attractive as a possible explanation. Nevertheless, both Marco and Stern (1974) and McCandless (1975), after analyses of this kind of junior-senior repeater hypothesis, concluded that no more than about 3 points of the score decline could be accounted for in this way.

A second kind of repeater hypothesis holds that students who repeat the test today are gaining less in their scores than those who repeated several years ago. That is, it is possible that there has been a

Table 3. Number of SAT Scores Received by Colleges and Universities Grouped by Carnegie Commission Classification in 1960-61, 1966-67, and 1973-74[a]

Classification	Control	Number of SAT reports (in thousands)			Percent of SAT reports		
		1960-61	1966-67	1973-74	1960-61	1966-67	1973-74
Research universities I[b]	Public	189	347	345	13.0	12.1	13.0
	Private	152	192	171	10.5	6.7	6.4
Research universities II[b]	Public	151	286	199	10.4	10.0	7.5
	Private	73	96	65	5.0	3.3	2.5
Doctoral-granting universities[b]	Public	75	221	245	5.2	7.7	9.2
	Private	112	166	122	7.8	5.8	4.6
Comprehensive universities and colleges	Public	141	526	502	9.7	18.4	18.9
	Private	177	313	244	12.2	10.9	9.2
Liberal arts colleges I[c]		191	224	150	13.2	7.8	5.6
Liberal arts colleges II[c]		108	260	209	7.5	9.1	7.8
Other specialized (including service academies)		34	33	33	2.3	1.1	1.3
Two-year colleges		28	141	229	1.9	4.9	8.6
Other institutions (including unclassified and unknown)[d]		19	59	145	1.3	2.1	5.5
Total		1,449	2,864	2,660	100.0	100.0	100.0

Footnotes for Table 3

a. Preliminary. From Schrader (1975).
b. The classification of doctoral-granting institutions was based on amount of federal financial support and on number of Ph.D.s (and M.D.s) granted. Research universities I ranked highest on these bases, research universities II second, and doctoral-granting universities third.
c. The classification of liberal arts colleges was based on Astin's selectivity index and on the number of graduates who earned doctorates. Liberal arts colleges I ranked higher on these bases.
d. This group included a variety of professional and specialized universities not classified in the Carnegie Commission report in any of the categories shown above and also included institutions (e.g., hospital schools of nursing, two-year colleges) not listed in the report.

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reduction in the gain achieved by those who do repeat and that this reduction could have resulted in a decline in the overall mean. Table 4 shows the mean gains in SAT scores for three points during the years of the score decline for different repeating patterns. At the bottom of Table 4, weighted average gains are presented. These weighted average gains show an overall reduced gain of about 8 points on SAT-verbal and about 9 points on SAT-mathematical. For the intermediate point (1967-68), the reduction in gain is more. Since only 200,000-300,000 of the more than one million students taking the test are represented in these junior-senior repeaters, however, little impact on the overall SAT means could be accounted for by these reduced gains shown. Of course, there are others who repeat in addition to those who repeat in the junior to senior pattern--including those who repeat during their senior year and those who repeat after graduation. Additionally, there exists a large group of "repeaters" who take the PSAT/NMSQT[3] (which is similar to the SAT) as juniors and also take the SAT as seniors.

SAT Score Distributions

Changes in SAT score distributions during the period of declines in mean scores are shown in Table 5. The percentage of students scoring in the 700-800 range on the verbal sections of the SAT declined from 2.3 percent in 1967 to 1.1 percent in 1975. In the 600-700 range, the percentages dropped from 10.2 percent in 1967 to 7.0 percent in 1975. A similar but smaller drop in the high scores occurred for the mathematical sections of the SAT.

These percentage reductions in the high score ranges could have resulted merely from greater numbers in the lower ranges, and such a trend seems reasonable in view of apparent increases in students of low socioeconomic status (SES) entering college in recent years. There is, however, an anomaly that is as yet unexplained. The absolute number of

Table 4. Mean Gains in SAT-Verbal and SAT-Mathematics Scores From Junior to Senior Year

Repeat pattern		Testing year of final score 1962-1963	1967-1968	1973-1974
March to November	V	---	---	17.3
	M	---	---	21.3
	N	---	---	25,758
March to December	V	42.1	19.9	19.4
	M	33.2	18.0	17.9
	N	44,930	67,153	10,923
April/May to November	V	---	---	23.4
	M	---	---	21.0
	N	---	---	110,996
April/May to December	V	24.1	14.0	24.4
	M	23.3	13.5	15.4
	N	96,474	207,094	43,691
July to November	V	---	---	14.9
	M	---	---	4.8
	N	---	---	24,618
March to Jan./Feb.	V	40.1	25.0	17.8
	M	38.0	19.0	25,9
	N	5,891	3,938	1,021
April/May to Jan./Feb.	V	22.9	19.3	22.0
	M	28.8	14.0	20.4
	N	16,634	13,008	4,580
July to Jan./Feb.	V	---	---	17.4
	M	---	---	13,9
	N	---	---	1,342
Weighted average	V	29.5	15.8	21.2
	M	27.1	14.6	17.8
	N	163,929	291,193	222,929

Table 5. Percentage of SAT Scores[a] in Given Score Ranges

Section	1966-1967	1967-1968	1968-1969	1969-1970	1970-1971	1971-1972	1972-1973	1973-1974	1974-1975
Verbal									
700-800	2.3	2.0	1.8	1.7	1.7	1.4	1.1	1.2	1.1
600-699	10.2	10.1	9.9	10.1	9.4	9.0	8.0	7.7	7.0
500-599	23.9	23.4	23.9	23.6	23.5	22.8	21.5	20.6	21.1
400-499	35.4	34.6	33.6	33.1	33.8	33.8	33.6	34.2	34.2
300-399	22.9	24.5	23.8	25.0	25.1	25.9	27.9	28.0	27.4
200-299	5.3	5.4	6.0	6.6	6.4	7.2	7.8	8.2	9.2
Mean	467	466	462	460	454	450	443	440	437
SD	109	108	108	110	109	108	107	107	108
Math									
700-800	3.9	3.6	3.5	3.5	3.6	3.0	3.2	3.4	3.3
600-699	14.0	14.6	14.1	14.0	14.5	13.9	13.2	13.0	12.3
500-599	29.1	28.6	28.6	28.5	27.9	28.4	28.8	27.0	26.3
400-499	32.7	31.0	31.2	31.0	31.4	30.8	30.7	30.5	30.1
300-399	17.4	18.3	18.7	18.9	19.0	19.9	20.1	21.5	23.0
200-299	2.9	3.8	3.8	4.1	3.6	3.9	4.1	4.6	5.0
Mean	495	494	491	488	487	482	481	478	473
SD	110	112	111	113	113	112	112	115	114

a. These scores represent all scores reported. Thus, persons having more than one score are counted more than once.

students scoring in the very high ranges of SAT scores has also declined. In 1967, more than 30,000 persons scored in the 700-800 range on the verbal sections of the SAT; this absolute number of scores in the 700-800 range declined gradually until, in 1975, it was only about 15,000. This gradual decrease in scores in the high ranges has occurred despite fluctuations in the total numbers of students taking the SAT.

An attitudinal hypothesis is one of the few that would explain this drop in scores in the high ranges. Those who repeat, and others, may have changed in their attitude concerning the SAT. For example, one can imagine that, during periods when college access is highly competitive, students may strive for high scores either the first time the test is taken or by repeating the test one or more times. A change in attitude would follow from the situational context of recent years, during which colleges have actively recruited students rather than carefully selecting from large applicant pools.

THE COLLEGE-BOUND POPULATION

To a degree, the SAT population represents the college-bound population, but it must be recognized that not all persons seeking college admission take the SAT. Many institutions require the test administered by the American College Testing Program (the ACT), other institutions allow an option of the SAT or the ACT, and some institutions require neither. Most college-bound students, however, take either the SAT or the ACT, and some take both. In examining the college-bound population, therefore, the experiences of the ACT are of special interest, since if both testing programs have had similar experiences, those experiences would be representative of the college-bound population. On the other hand, if these two national testing programs have had different experiences, the causes would seem to reside within the programs and not in the college-bound population.

Trends in ACT Scores

Consider the decline in mean ACT scores shown in Table 6. Between 1965 and 1974, the mean ACT English score declined from 18.7 to 17.6 (1.1 ACT scale points), the mean ACT Mathematics score from 19.6 to 18.1 (1.5 ACT scale points), and the mean ACT Social Studies score from 20.6 to 17.9 (2.7 ACT scale points). The fourth part of the ACT test, Natural Science Reading, did not show a significant change in mean score. The four ACT subscores are combined to form what is known as the ACT Composite score. For 1975, the ACT Composite score mean was reported to be 18.6--a decline of 1.3 ACT scale points since 1965, when the ACT Composite score mean was 19.9.

If one assumes that the SAT standard deviation is constant at about 110 and that the ACT standard deviation is constant at about 5.5, the SAT "composite" score (combining verbal and mathematical) decline between 1965 and 1975 is about 31/110=.28, and ACT Composite mean score

Table 6. Means and Standard Deviations for College-Bound Students Taking the ACT Tests in Successive Years[a]

Year	English		Mathematics		Social Studies		Natural Science		Composite	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1964-65	18.7	5.1	19.6	6.6	20.6	6.4	20.4	6.1	19.9	5.2
1965-66	19.1	5.1	19.5	6.7	20.5	6.4	20.5	6.1	20.0	5.2
1966-67	18.5	5.3	18.7	7.0	19.6	6.6	20.1	6.3	19.4	5.4
1967-68	18.1	5.3	18.3	7.3	19.4	6.7	19.8	6.5	19.0	5.5
1968-69	18.4	5.2	19.2	6.9	19.4	6.7	20.0	6.4	19.4	5.3
1969-70	18.1	5.3	19.5	6.7	19.3	6.8	20.5	6.1	19.5	5.3
1970-71	17.7	5.6	18.7	7.2	18.3	7.2	20.2	6.4	18.9	5.6
1971-72	17.6	5.6	18.6	7.3	18.4	7.3	20.3	6.5	18.8	5.7
1972-73	17.8	5.4	18.8	7.2	18.1	7.5	20.5	6.5	18.9	5.8
1973-74	17.6	5.4	18.1	7.5	17.9	7.6	20.6	6.5	18.7	5.8
1974-75									18.6[b]	

a. From Ferguson and Maxey (1975).
b. From ACTivity, October 1975.

decline is about 1.3/5.5=.24. The overall declines in SAT and ACT means, therefore, would appear to be of the same order of magnitude.[4] The SAT-verbal score means and the ACT Social Science reading score declined more than did the overall means.

Since almost all the students in the college-bound population take either the SAT, the ACT, or both, these declines are for the most part representative of the college-bound population.

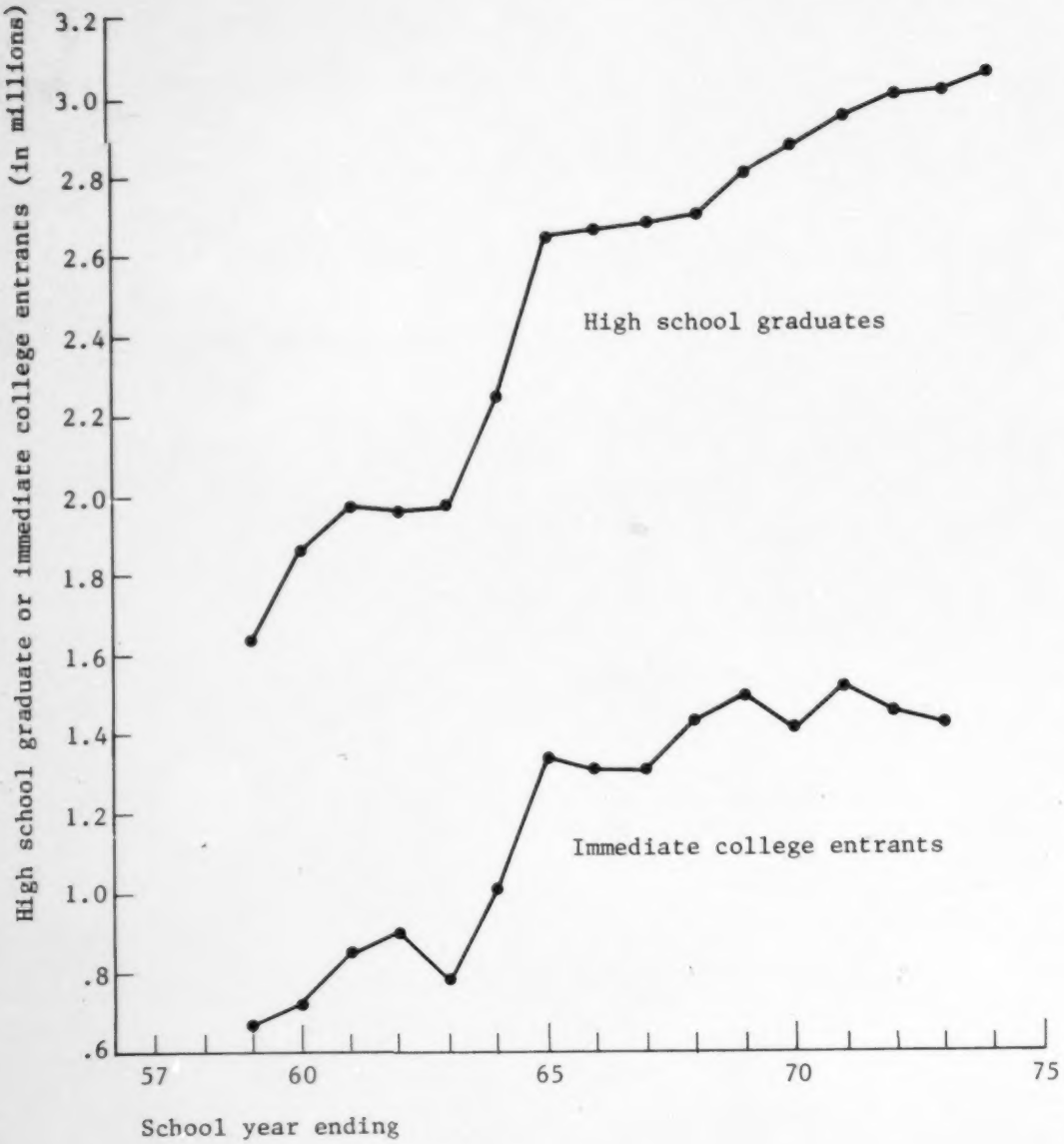
College Attendance Patterns

To gain an initial sense of the relationship between these SAT and ACT score declines and college-going, it is useful to consider the score decline patterns with the college attendance patterns. Figure 2 shows the numbers of high school graduates and immediate college entrants during the period of the score declines. Notice that the year in which the score declines began, 1963, is the same year that the numbers of immediate college entrants began to increase markedly. The increase in college-going reflects, of course, the post-World War II population boom that began in 1946. On the surface, however, there would seem to be no particular reason why an increase in the numbers of persons going to college should cause the academic abilities of those persons to decline. College enrollment could increase simply as a result of a population increase in the college-bound age group, because greater proportions of this age group are considering college, or because of combinations of these population and choice factors. But choice is influenced by high school graduation, since few who do not graduate from high school have the option of attending college. Thus, rates of high school graduation must also be a consideration.

A view of this situation is provided in Table 7 where the numbers of 17-year-olds, the numbers of high school graduates, the numbers of first-time degree-credit enrollments, and associated ratios are given for most of the period of interest. The numbers of persons in the 17-year-old cohort, graduates from high school, and persons enrolling for first-time degree credit all increased substantially during the period 1961 to 1971. However, most of the ratios shown at the right in Table 7 increased as well. That is, using either the number of high school graduates or the number of 17-year-olds in a given year as the base, the ratios of college enrollment increased during the period 1961 to 1971. The source of the increase appears to be an increase in enrollment in two-year colleges, since the ratios for four-year colleges did not increase.

A slightly different view of the college-bound population is given by considering only immediate college entrants (high school graduates who were enrolled in college in October of their year of graduation). Figure 3 shows trends in the percentages of 18-year-olds who, in October of each year, had graduated from high school and/or enrolled in college. Also shown is the percentage of high school graduates entering college. Evident in the data of Figure 3 are fluctuations not indicated in Table 7. The reasons for the differences may be related to "stopouts," i.e., students who delay college entry rather than enrolling in the fall immediately following graduation from high school. There is no reason to believe that in recent years

Figure 2. Numbers of High School Graduates and Immediate College Entrants*



*Adapted from McCandless (1975).

Table 7. College Enroilments During the Period of the SAT Score Decline as a Function of the High School Cohort and Institution Type

Numbers (in thousands)

School Year	17-year-olds[a]	High school graduates	First-time degree-credit enrollment (fall) 4-year[c]	2-year[e]	all[c]
1960-61		1,971	774	244	1,018
1961-62	2,768	1,925	770	260	1,030
1962-63		1,950	774	272	1,046
1963-64	3,001	2,290	903	322	1,225
1964-65		2,665	1,041	401	1,442
1965-66	3,515	2,672	989	389	1,378
1966-67		2,679	992	447	1,439
1967-68	3,521	2,702	1,076	554	1,630
1968-69		2,829	1,107	642	1,749
1969-70	3,727	2,896	1,126	654	1,780
1970-71		2,943	1,096	670	1,766
1971-72		3,043			
1972-73					
1973-74					

Ratios

School Year	HS grads./ 17-year-olds	4-yr. Coll./ HS grads.	2-yr. Coll./ HS grads.	All Coll./ HS grads.	4-yr. Coll./ 17-year-olds	2-yr. Coll./ 17-year-olds	All Coll./ 17-year-olds
1960-61	.69[f]	.39	.12	.52			
1961-62	.70	.40	.14	.54	.28	.09	.37
1962-63		.40	.14	.54			
1963-64	.76	.39	.14	.54	.30	.11	.41
1964-65		.39	.15	.54			
1965-66	.76	.37	.15	.52	.28	.11	.39
1966-67		.37	.17	.54			
1967-68	.77	.40	.20	.60	.31	.16	.46
1968-69		.39	.23	.62			
1969-70	.78	.39	.23	.61	.30	.18	.48
1970-71	.76[f]	.37	.23	.60			
1971-72							
1972-73							
1973-74							

Footnotes for Table 7

a. National Center for Educational Statistics (NCES), Digest of Educational Statistics, 1971, Table 68, page 51.
b. NCES, Projections of Educational Statistics, 1972, Table 20, page 47.
c. Ibid., Table 14, page 36.
d. Ibid., Table 15, page 37.
e. Ibid., Table 16, page 38.
f. NCES, Digest of Educational Statistics, 1971, Table 68, page 51 (given as percent of 18-year-olds).

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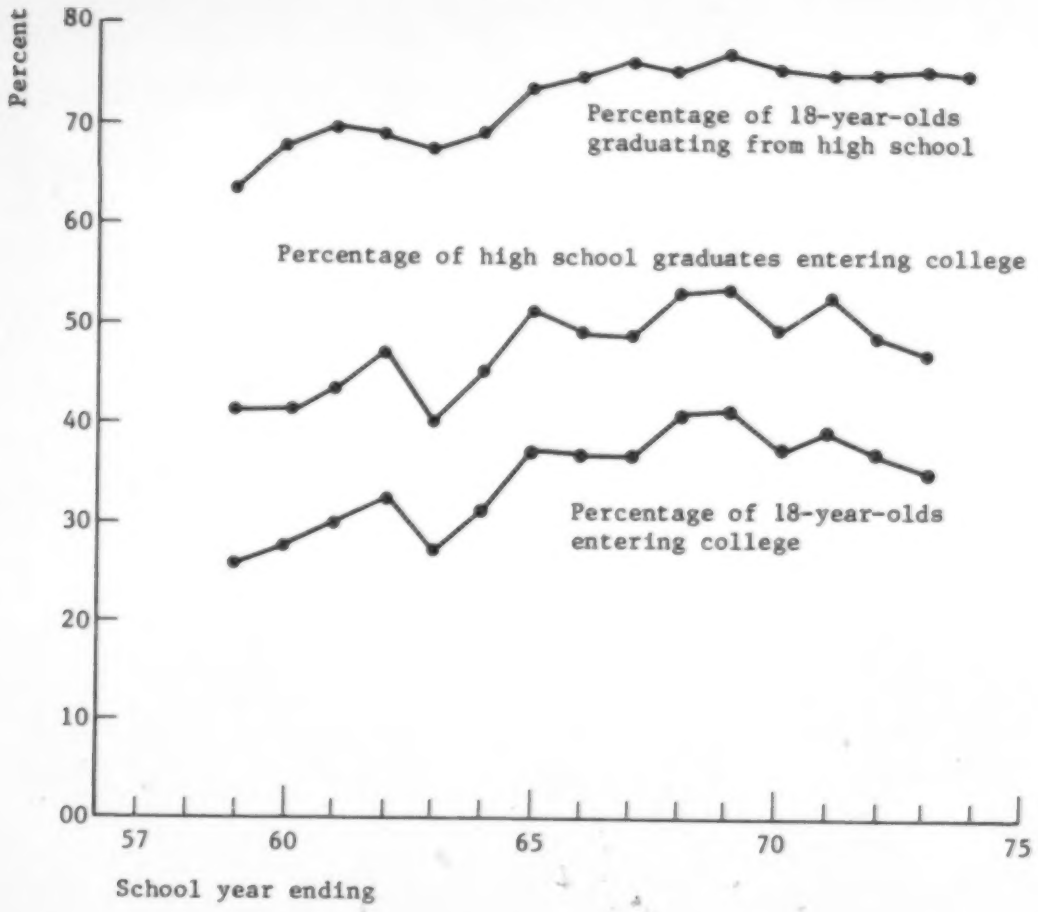
the proportion of stopouts has increased, and this stopout increase would be supported by the downturn in the percentages of high school graduates immediately entering college shown in Figure 3 for the period 1971 to 1973.

Minorities

It is well known that the national college enrollment of minorities has increased substantially during the last 15 years. However, in relation to national college enrollments as a whole, the increase in minority enrollment is such a small proportion that it is unlikely that a significant part of the score decline could be attributed to this increase.

The increase in minority enrollment is documented from a number of scores. Table 8 shows total college enrollment, minority enrollments, percentages of the total represented by minorities, and percentages of high school graduates enrolled in college in terms of total, white, and nonwhite classifications. As suggested in notes to the table, these data should be interpreted with caution. The percentages of nonwhite graduates enrolling in college have wide fluctuations resulting from small census samples. The figures on percent minority enrollment of total college enrollment is corroborated by data collected by the American Council on Education (ACE) for the same period. ACE has developed norms for entering college freshmen annually for a number of years in terms of a wide range of variables, including racial composition. For the freshman class beginning in fall 1966, 10.8 percent in public four-year colleges were either black or American Indian (ACE, 1967, p. 22). In 1972, this figure had increased to 15.9 percent (ACE, 1972, p. 33). That such increases in minority enrollments were not limited to public institutions is also indicated. In 1966, 2.4 percent of students in private universities were black or American Indian. In 1972, this figure was 5.4 percent. Thus, whether one uses the data of Table 8, or that reported by ACE, a proportional increase in minority enrollment of only 4 to 5 percent during the years of the score declines is indicated. Such a small proportional increase in minorities could have only a minimal impact on mean scores. Additionally, it should be noted that for the academic years 1971-72

Figure 3. Rates of High School Graduation and Immediate College Entry for the 18-Year-Old Cohort*



*Adapted from McCandless (1975).

Table 8. College Enrollments of Minorities

Year	Total college enrollment[a] (in thousands)	Total minority enrollment[a] (in thousands)	Minorities as % of total[a]	Percentages of high school graduates enrolled in college			
				Class	Total	White	Nonwhite
1962				1962	49	51	34
1963				1963	45	46	38
1964	4,643	23[illegible]	5.0%	1964	48	49	39
1965	5,675	274	4.8	1965	51	52	43
1966	5,999	282	4.7	1966	50	52	32
1967	6,401	370	5.8	1967	52	53	42
1968	6,801	435	6.4	1968	55	57	46
1969	7,435	492	6.6	1969	53	55	37
1970	7,413	522	7.0	1970	52	52	48
1971	8,087	680	8.4	1971	53	54	47
1972	8,313	727	8.7	1972	49	49	48[c]
1973				1973	47	48	35[d]
1974				1974	48	47[e]	51[e]

a. From F. Newman et al., The Second Newman Report: National Policy and High Education, 1973, page 143.
b. From The Monthly Labor Review, September 1974, page 50 (Michelotti, 1974), and The Monthly Labor Review, August 1975, page 35 (Young, 1975). The percentages for the class of 1974 are from the latter. These percentages are based upon civilian, noninstitutionalized high school graduates enrolled in college in the fall term immediately following their graduation from high school.
c. The standard error of this percentage is 4.6.
d. The standard error of this percentage is 4.4.
e. Young (1975) notes: "The proportion of blacks, which had dipped in 1973, returned to the level of the early seventies and was not significantly different from that for whites." (p. 36)

through 1974-75 no substantial change in the proportion of minorities taking the SAT occurred.

Low-SES Students

More important than increases in minority enrollments may be increases in enrollment of low-SES students. Some of the best available evidence on college attendance patterns of low- and middle-SES students during the past several years has been compiled by Cross (1971). Table 9, adapted from Cross, shows data from three different studies spanning the period 1957 to 1967. Although such comparisons should not be interpreted too rigorously, Table 9 would indicate that the proportion of low-SES students attending two-year and four-year colleges has been increasing more rapidly than the proportion of high-SES students. Note that the attendance rates for high-ability, high-SES males remained practically constant at about 90 percent from 1957 to 1967. The same constancy is observable in the second and third ability quarters for the high-SES group. A further comparison of this type will be possible for 1972 when follow-up data from the National Longitudinal Study (NLS)[5] have been analyzed. Since the correlations between SES and test scores is well known, these shifts in college-going patterns by SES groups represent compelling evidence for the part of the decline in average scores occurring between 1963 and 1967. Since about 1971, however, the data of Figure 3 indicate a decrease in proportions of cohorts entering college. Unless there was a concomitant decrease in high- and middle-SES students going on to college, a proportional increase in low-SES students during this later period would not appear possible for immediate college entrants.

Low-Ability Students

Cross (1971) observed that there may have been an increased tendency for low-ability students to consider college, regardless of SES. In describing this trend, Cross defined a new class of students that she called the "New Students." Cross states:

> "The definition of New Students as those scoring low on traditional tests of academic ability may at first seem unacceptable to some readers. Therefore, let me make explicit the reasons for this decision. The primary reason is the very obvious one already discussed. Young people who have not considered college in the past but who are newly entering college in the 1970's are distinguished more by low test scores than by any other single measure available, including race, sex, and socioeconomic status." (p. 14)

THE SCHOOLS

One of the most popular explanations for the decline in SAT and ACT test-score averages is that students graduating from American high

Table 9. Percentages of High School Graduates Attending Two- or Four-Year Colleges[a]

Ability quarter	Socioeconomic quarter: 1 (low) 1957[b]	1961[c]	1967[d]	2 1957	1961	1967	3 1957	1961	1967	4 (high) 1957	1961	1967
Male:												
1 (low)	6	9	33	12	14	30	18	16	29	39	34	57
2	17	16	43	27	25	39	34	36	55	61	45	61
3	28	32	60	43	38	69	51	48	68	73	72	79
4 (high)	52	58	75	59	74	80	72	79	89	91	90	92
Female:												
1 (low)	4	8	25	9	12	28	16	13	36	33	26	37
2	6	13	28	20	12	36	26	21	50	44	37	67
3	9	25	44	24	30	48	31	40	68	67	65	77
4 (high)	28	34	60	37	51	73	48	71	83	76	85	93

a. Adapted from K. Patricia Cross, Beyond the Open Door, 1971.
b. 1957 graduates, with 1964 follow-up; Sewell and Shah (1967).
c. 1961 graduates, with 1962 follow-up; Schoenfeldt (1968).
d. 1967 graduates, with 1968 follow-up; ETS Growth Study data analysis by Thomas Hilton.

schools are less capable than students in previous years. Two recent and comprehensive research efforts (Armbruster, 1975; Harnischfeger et al., 1975) contain, among other things, useful information concerning the schools. Trends toward promoting and graduating students who have not mastered essentials along with reductions in course requirements are usually the focus of explanations pointing to the schools.

Proportions of Cohorts Graduating

In 1959, slightly more than 60 percent of persons 18 years old in the United States were graduating from high school; in 1973, this percentage was well over 70 percent. Armbruster (p. 84) reports U.S. Census data showing that the percent of cohort kept back one year and/or dropped out by the eleventh grade decreased from 34.9 percent in 1960 to 16.0 percent in 1970. These percentages indicate that students are promoted through the grades who, in previous years, were kept back until they knew the subject matter. Figure 3 shows trends in percentages of persons graduating from high school over the years from 1959 to 1973. Although there has been an increase in proportion of cohort graduating, the nature of the increase is of special interest. Note in Figure 3 that the major portion of the increase in the proportion of cohort graduating from high school occurred between the years 1963 and 1966. By 1967, the trend had leveled off. Table 7 shows that the proportion of cohort graduating leveled off in 1964. Therefore, although the decline in the means of SAT and ACT test scores that occurred between 1963 and 1966 might be associated with an increased proportion of cohort graduating (or reduced school effectiveness resulting from the increased retention rates) during those years, the continued decline in scores beyond 1966 would appear not to be. Even with a decline in the proportion of cohort graduating, a softening of the requirements for graduation could have contributed to the declines in SAT and ACT mean scores. Harnischfeger et al. (1975) have assembled information suggesting that fewer of the basic courses are now required in many schools.

Abilities of High School Graduates

The best data for the analysis of high school graduate ability trends are those obtained from comparable national random samples selected and tested in different years. Unfortunately there have been few of them because studies of this type are expensive. The studies that have been conducted are often questioned on the grounds of sample bias or other methodological problems. Still, the care with which national studies are conducted should make them better indicators than samples of students obtained with no control whatever--such as for the SAT and ACT.

In one study of controlled high school samples, Flanagan and Jung (1971) investigated possible changes in reading comprehension, an area of basic importance for all types of academic development, covering the period from 1960 to 1970. As a part of the well-known Project TALENT study, over 400,000 high school students representing a random sample

of 1,353 different schools were administered a 48-item reading comprehension test in 1960. Ten years later the identical reading test was administered to more than 12,000 high school students in 134 schools, this smaller sample having been chosen in the same way as the 1960 sample. Over the 10-year period, June 1960 to 1970, the mean score obtained from this 48-item test increased slightly from 30.81 to 31.25. As might be expected, Flanagan and Jung had difficulty in making arrangements with the schools in 1970 that had been in the original 1960 sample. Some of the schools no longer existed, and biases of several types undoubtedly affected the results. Accordingly, the results may be questioned. But this kind of research evidence represents more control of possible confounding influences than casual observations of SAT mean scores over the years.

In a second study of controlled high school samples, Schrader and Jackson (1975) obtained special samples for the norming of the PSAT/NMSQT. The PSAT/NMSQT is an instrument similar to the SAT but taken, usually, by high school students in their junior year. The scale of the PSAT/NMSQT extends from 20 to 80 rather than from 200 to 800 as in the SAT, but PSAT/NMSQT scores are equivalent to SAT scores if multiplied by a factor of 10. The high school students who normally take the PSAT/NMSQT are, on the average, more capable than the average high school students. Schrader and Jackson, however, used special PSAT/NMSQT norming samples for the years 1960, 1966, and 1974 for their study. In 1974, 17,770 juniors in 142 high schools were selected in approximately the same way as the 1960 and 1966 samples. As in the two previous norms studies, the schools invited to participate in the 1974 norms study were chosen to be representative of all high schools in the United States. There were some differences in the selection process, however. In 1960, more than seven-tenths of the schools invited provided PSAT/NMSQT data for their juniors. In 1966 and 1974, six-tenths of the schools invited provided usable data. Accordingly, the samples did not compare perfectly, and the possibility of differential sampling bias exists. When mean PSAT/NMSQT scores were computed for the verbal and mathematical sections in the three years of the Schrader and Jackson study, the results were as shown in Table 10. These results support neither the Flanagan and Jung finding of no change nor the opposite contention that high school abilities are steadily declining. Table 10 shows that PSAT/NMSQT-verbal means increased between 1960 and 1966 and then decreased in 1974. PSAT/NMSQT-mathematical means show an opposite trend, decreasing from 1960 to 1966 and increasing from 1966 to 1974.[6]

Table 10. Average PSAT/NMSQT Scores for High-School Juniors from Three Norming Samples[a]

Year	PSAT/NMSQT-verbal	PSAT/NMSOT-mathematical
1960	34.2 (342)	38.7 (387)
1966	35.8 (358)	37.8 (378)
1974	34.3 (343)	38.6 (386)

a. Equivalent mean PSAT/NMSQT scores, in terms of the SAT scale, are given in parentheses.

Bracken (1975, p. 42) reports results of national renorming studies of the Iowa Tests of Basic Skills (ITBS) carried out in 1955, 1964, and 1971 (original source: Hieronymus and Lindquist, 1974). These norming studies were conducted for grades 3 through 8; however, by adding four years to the grade 8 data, estimates of the abilities of grade 12 students for the years 1959, 1968, and 1975 may be derived. Some of the more relevant norm changes are given in Table 11. The 1964-71 interval in Table 11 would suggest that grade 12 students at both the 50th and 90th percentiles declined in traditional reading and mathematical skills (but not in vocabulary) between 1968 and 1975.

Bracken also reports (pp. 45-47) on renorming studies of the Comprehensive Tests of Basic Skills (CTBS) and the Iowa Tests of Educational Development (ITED). The CTBS studies were for grades 2 through 10 and covered the period 1968 to 1973. Lower scores were obtained in 1973 for all upper grades in all tests of the CTBS (reading, mathematics, language, and study skills), and the decline was larger the higher the grade. Extrapolation of the grade 10 data suggests a decline in the skills tested by the CTBS for grade 12 students during the period 1970 to 1975. The ITED norming studies showed gains between 1962 and 1975 for high school students in grades 9 through 12.[7]

Another approach to the examination of national trends is to consider results of statewide testing programs. Such data, however, have the disadvantage that migratory influences may affect them. Armbruster (1975) presents data showing convincing declines in reading and quantitative ability for grade 12 students in California between 1969 and 1973 (p. 59), for grade 8 students in Iowa between 1965 and 1972 (p. A-21), for grade 7 students in Michigan between 1970 and 1973 (p. A-23), and for grade 6 students in New York between 1966 and 1972. Nevertheless, Armbruster notes that some states have experienced increases in student performance (p. 49).

Perry and Swanson (1974) studied results from the Minnesota Statewide Testing Program in which almost all eleventh-grade students are tested each year. The test, a version of the Ohio State Psychological Examination, produces a single score measuring primarily verbal comprehension and reasoning. Both the mean and median scores have been declining consistently between the 1968-69 and 1972-73 academic years. Of special interest is that Perry and Swanson also observed a substantial decrease in the number of high scores.

Table 11. Changes in Grade Equivalents for Grade 8 Students on Selected ITBS Tests[a]

Students at	Interval	Vocabulary	Reading	Mathematics
50th percentile.	1956-64	-0.8	2.5	1.6
	1964-71	0.4	-2.1	-3.1
90th percentile.	1956-64	-1.4	-0.5	4.1
	1964-71	0.0	-1.5	-2.1

a. Adapted from Bracken (1975), p. 42.

Despite its questionable generalizability, the comparison of performance, over time, of students within individual schools is of interest--especially when information is also available on important factors that have existed concurrently with the longitudinal comparison. Hawes (1972) reported declines in SAT scores for a stable, high-SES New York state high school over a 10-year period. Between 1962 and 1972, the SAT-verbal median score declined from 575 to 522, even though the town population was unusually stable during this period. Other individual high schools, however, have reported that test scores have increased or have been stable, despite a national decline.

Although much of the available evidence on the performance of high school students during the period of the SAT and ACT score declines would indicate a national decline in traditional academic skills, the lack of consistency in results suggests caution in placing the burden on the schools. More definitive data will come, in time, from the studies of the National Assessment of Educational Progress (NAEP). Baseline data were collected in 1971, and some limited follow-up data have been collected. A 1975 follow-up on writing skills indicates a decline since 1971. No follow-up data are as yet available from the NAEP on reading abilities of the type measured in the SAT. National random samples, like those used by the NAEP, are essential for resolving issues concerning trends in the abilities of the national population.

SOCIETAL FACTORS

Some would argue that changes in the school population are merely reflections of changes in American society. Trends in the adolescent subculture toward drug usage, alcoholism, television watching, and similar societal factors could also have a detrimental effect upon the development of academic skills. It must also be remembered that the children of the period being examined are part of an unusual population upsurge.

There is some research evidence to indicate that there may have been subtle factors operating, especially in the post-World War II boom population. The well-known negative correlation between family size and test performance (children from larger families tend to score lower, on the average, than children from smaller families on almost all kinds of mental tests) is one such factor. Since family size was increasing during the period of the post-World War II population surge, the relationships between family size and test scores would predict a decline in scores for the high school cohort beginning in about 1963, precisely when the SAT decline did, in fact, begin. Zajonc (1975) has shown how mean birth rank, another changing characteristic of the 1946-1956 birth years, correlates with the SAT and other score declines. Grabill, Kiser, and Whelpton (1958) noted that the population increase was disproportionate by SES groups. High- and middle-SES families contributed more to the boom than did low-SES families. But an increase in the higher-SES part of the population in the late 1940s would have tended to produce higher rather than lower scores in the

mid-1960s because of the correlation of SES and test performance. And one cannot ignore a possible impact of the GI Bill of Rights. Following World War II, for the first time in American history, large numbers of persons from traditionally nonacademic families went to college. Their children were represented in the SAT and ACT mean score declines. With such an assortment of possible influences operating, it would be surprising if average scores on tests like the SAT and the ACT had remained stable during the period of the declines.

Undoubtedly the rise of television during the same period also had some impact. Just what that impact has been, however, is uncertain. Roger Farr, a recognized expert on the development of reading abilities, has argued that television may enhance reading ability. In a comprehensive review of reading abilities by Farr (1975) at several population levels, it was suggested that reading ability in both public and private schools increased from the 1930s until about 1965. A slight decline in reading ability was observed after 1965, but students in 1975 still read better than did students in 1945.

Another view of societal trends in America is offered by the renorming of the Stanford Binet test in 1970 by Thorndike (1975). The Stanford Binet was normed, originally, in 1937, and Thorndike's new norms indicate a gain in the ability of the national population since 1937. Thorndike notes:

"The general rise in IQ level is not surprising. Such a rise has been reported by test-makers on all sorts of ability tests both in this country and abroad." (p. 6)

With respect to Thorndike's contention that abilities have also been increasing abroad, some reading data from England are of interest. Start (1972) reported a study of 11- and 15-year-old English children's reading abilities between 1948 and 1971. Two tests were administered to a stratified random sample of students. The results, presented in Table 12, indicate a gradual increase in reading ability in England between 1948 and 1971. These data on a non-U.S. population are particularly interesting vis-a-vis the hypothesis that time spent watching television is depriving children of valuable reading time and causing a decline in reading skills. Television has also been popular in England.

Table 12. Mean Reading Scores of 11- and 15-Year-Old English Children since 1948[a]

Age	Test	1948	1952	1955	1956	1960	1961	1964	1970	1971
11	WV[b]	11.6	12.4	--	13.3	--	--	15.0	14.2	--
years	NS6[c]	--	--	28.7	--	29.5	--	--	29.4	--
15	WV[b]	20.8	21.2	--	21.7	--	24.0[d]	--	--	23.5
years	NS6[c]	--	--	42.2	--	44.6	--	--	--	44.6

a. From Start (1972). Dashes indicate no testing that year.
b. Watts-Vernon Test (35 items).
c. National Survey Form Six (60 items).
d. Mean of two estimates.

CONCLUSIONS

The research evidence that has been presented allows no firm conclusions concerning the declines in mean scores of the SAT or of the ACT. The declines in these two widely used tests, however, appear to be of about the same order of magnitude. Since these two tests are administered to the majority of the college-bound population, and since considerable evidence exists to indicate that the college-bound population has changed over the period of the score declines, it is suggested that those students considering college attendance have indeed changed in terms of traditional academic skills.

The picture for high school students and the national population as a whole is less clear. Considerable evidence suggests a decline in reading and other abilities of high school students, but other data suggest no change at all, and still other research would indicate that an increase in the abilities of high school students occurred during the period of the SAT and ACT mean score declines. One must conclude that the definitive data on this issue are not yet in. The NAEP efforts represent the best hope for resolving this question.

Until it can be determined whether or not there has, in fact, been a change in the abilities of high school graduates, causal analyses seem inappropriate. And because the apparent change in the abilities of the college-bound may possibly also reflect a change in the base population, only speculative observations of the causes for the changes in the college-bound population can be made.

Nevertheless, the cumulative research evidence would indicate that a number of factors, rather than any single cause, have probably contributed to the score decline. The college-bound population, during the years between about 1960 and 1975, appears to have increased in its representation of low-SES families, the mix of SAT user colleges has changed to include larger numbers of two-year colleges and proportionally fewer of the top-ranked four-year colleges and universities, the numbers of students repeating the SAT have declined, and the gains made by those who do repeat have decreased.

FOOTNOTES

1. The December 1973 population of examinees is not necessarily similar to the December 1963 population of examinees because of changes in college and scholarship requirements and because of changes in SAT administration patterns.
2. Carnegie Commission on Higher Education, A Classification of Institutions of Higher Education. New York: McGraw-Hill, 1974.
3. Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualification Test.
4. If there has been a drift in the SAT scale, as discussed previously, then a similar drift would seem to have occurred in the ACT scale also.
5. The NLS is being conducted by the U.S. Office of Education with the assistance of Educational Testing Service and Research Triangle Institute.

6. To the extent that there has been a drift in the SAT scale as discussed on pages 6 and 7, its correction would affect the results obtained by Schrader and Jackson because the PSAT is linked to the SAT scale using the same scale equating methods.
7. In an earlier study by Schrader (1968), comparisons of renorming studies of several national tests also suggested gains, but, these comparisons were based on children up to only grade 8 in the early 1960s.

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